WHAT IS CLAIMED IS:

1. A method for transmitting an optical signal comprising:

receiving a transmitted optical signal as a received signal, the received signal being transmitted over a first optical fiber path and having at a transmitting end of the optical fiber a first power P_1 and having at a receiving end of the optical fiber a second power P_2, wherein $P_1 > P_2$;

separating the received signal to produce a plurality of bands; and

adjusting signal levels in each band to produce a plurality of adjusted bands, wherein a total power of the adjusted bands is substantially equal to P_1.

2. The method of claim 1 wherein the step of adjusting includes amplifying each band by a predetermined gain.

3. The method of claim 1 further including combining the adjusted bands to produce a transmission signal, and transmitting the transmission signal along a second optical fiber path.

4. The method of claim 1 further including separating each of the bands to produce a plurality of second bands.

5. Apparatus for transmitting an optical signal comprising:

a demultiplexer having an input for receiving a transmitted optical signal as a received signal, the received signal being transmitted over a first optical fiber path and having a first power, P_1, at a transmitting end of the optical fiber and a second power, P_2, at a receiving end of the optical fiber, wherein $P_1 > P_2$, the demultiplexer operable to separate the received signal to produce a plurality of bands; and

a plurality of optical amplifiers coupled to the demultiplexer, each optical amplifier coupled to receive one of the bands, each optical amplifier configured to output an adjusted band such that a total power of the adjusted bands is substantially equal to P_1.

6. The apparatus of claim 5 further including a multiplexer to combine the adjusted bands to produce a transmission signal and a second optical fiber path operatively coupled to the multiplexer for transmission of the transmission signal therealong.

7. The apparatus of claim 5 further including a plurality of second demultiplexers, each second demultiplexer coupled to one of the optical amplifiers, each second demultiplexer producing a plurality of second bands.

8. A method for transmitting an optical signal comprising:

receiving a transmitted optical signal as a received signal, the received signal being transmitted over a first optical fiber path and having at a transmitting end of the optical fiber a first power P_1 and having at a receiving end of the optical fiber a second power P_2, wherein $P_1 > P_2$;

separating the received signal to produce a plurality of bands; and

adjusting each band to produce a plurality of adjusted bands, including adjusting signal levels in each band such that a total power of the adjusted bands is substantially equal to P_1 and such that, for each band, intensity levels of frequency components comprising the band are substantially equal thus compensating for gain tilt due to stimulated Raman scattering.

9. The method of claim 8 further including combining the adjusted bands to produce a transmission signal, and transmitting the transmission signal along a second optical fiber path.

10. The method of claim 8 further including separating each of the bands to produce a plurality of second bands.

11. Apparatus for transmitting an optical signal comprising:

a demultiplexer having an input for receiving a transmitted optical signal as a received signal, the received signal being transmitted over a first optical fiber path and having a first power (P_1) at a transmitting end of the optical fiber and a second power (P_2) at a receiving end of the optical fiber, wherein $P_1 > P_2$, the demultiplexer being operable to separate the received signal to produce a plurality of bands; and

a plurality of optical amplifiers coupled to the demultiplexer, each optical amplifier coupled to receive one of the bands, each optical amplifier having an associated predetermined gain value to amplify its received band to produce an adjusted band such that a total power of all the adjusted bands is substantially equal to P_1,

each optical amplifier further operable to amplify frequency components comprising the band so that their intensity levels are substantially equal, thus compensating for gain tilt due to stimulated Raman scattering.

12. The apparatus of claim 11 further including a multiplexer to combine the adjusted bands to produce a transmission signal and a second optical fiber path operatively coupled to the multiplexer for transmission of the transmission signal therealong.

13. The apparatus of claim 11 further including a plurality of second demultiplexers, each second demultiplexer coupled to one of the optical amplifiers, each second demultiplexer producing a plurality of second bands.

14. A method for transmitting an optical signal from a sending station to a receiving station, wherein a plurality of one or more relay stations are disposed between the sending station and the receiving station, the method comprising:

receiving a transmitted signal at one of the relay stations as a received signal;

separating the received signal into a plurality of bands;

adjusting each band to produce a plurality of adjusted bands, including at least one of amplifying optical signals comprising each band in accordance with predetermined optical intensity parameters and adjusting a gain tilt of each band in accordance with predetermined gain tilt parameters;

combining the adjusted bands to produce a transmission signal;

transmitting the transmission signal to a second relay station or to the receiving station; and

repeating the above steps at one or more of the relay stations.

15. The method of claim 14 wherein the optical intensity parameters and the gain tilt parameters are determined based on transmission characteristics of all spans of optical fiber disposed between the sending station, the relay stations, and the receiving station.

16. The method of claim 14 wherein at one of the relay stations the received signal is transmitted without adjusting.

17. A method for transmitting an optical signal from a sending station to a receiving station, wherein one or more relay stations are disposed between the sending station and the receiving station, the method comprising:

storing optical intensity parameters and gain tilt parameters in a memory store;

receiving a transmitted signal at one of the relay stations as a received signal;

separating the received signal into a plurality of bands;

adjusting each band to produce a plurality of adjusted bands, including at least one of amplifying optical signals comprising each band in accordance with the optical intensity parameters and adjusting a gain tilt of each band in accordance with the gain tilt parameters;

combining the adjusted bands to produce a transmission signal; and

transmitting the transmission signal to a second relay station or to the receiving station,

the gain tilt parameters being determined based on transmission characteristics of all spans of optical fiber disposed between the stations,

the optical intensity parameters being determined based on the transmission characteristics of all the spans of optical fibers including for each span determining stimulated Raman scattering (SRS) induced variations, occurring at a receiving end of the span, of signal intensities in an optical signal based on the signal intensities of the optical signal as they occur at a transmitting end of the span.

18. The method of claim 17 wherein determining SRS-induced variations further includes computing a sum of signal intensities as they occur at a transmitting end of the span for all wavelength bands which comprise the optical signal.

19. Apparatus for transmitting optical signals comprising a sending station, one or more relay stations, and a receiving station, each relay station comprising:

a demultiplexer having an input portion for inputting a received optical signal and an output portion for outputting a plurality of bands;

a plurality of optical circuits, each having an input portion for inputting one of the bands, a control input portion for receiving signals representative of optical intensity parameters and gain tilt parameters, and an output portion for outputting an adjusted signal produced by adjusting the band in accordance with the signals received at the control input portion; and

a multiplexer coupled to the output portions of the optical circuits, the multiplexer having an output portion for outputting a transmission signal comprising the adjusted signals from the optical circuits,

the gain tilt parameters being determined based on transmission characteristics of all spans of optical fiber disposed between the stations,

the optical intensity parameters being determined based on the transmission characteristics of all the spans of optical fibers including, for each span, stimulated Raman scattering (SRS) induced variations of signal intensity of an optical signal at a receiving end of the span, the SRS induced variations being dependent on the signal intensity of the optical signal occurring at a transmitting end of the span.

20. The apparatus of claim 19 further including a data store configured to store the gain tilt parameters and the optical intensity parameters, the data store operatively coupled to the optical circuits to provide the optical intensity parameters and the gain tilt parameters.

21. Apparatus for transmitting an optical signal from a sending station to a receiving station, wherein a plurality of one or more relay stations are disposed between the sending station and the receiving station, the method comprising:

means receiving a transmitted signal at one of the relay stations as a received signal;

means separating the received signal into a plurality of bands;

means for adjusting each band to produce a plurality of adjusted bands, including at least one of amplifying optical signals comprising each band in accordance with one or more optical intensity parameters and adjusting a gain tilt of each band in accordance with one or more gain tilt parameters;

means for combining the adjusted bands to produce a transmission signal; and

means for transmitting the transmission signal to a second relay station or to the receiving station,

the gain tilt parameters being based on transmission characteristics of all spans of optical fiber disposed between the stations;

the optical intensity parameters being based on the transmission characteristics of all the spans of optical fibers.

22. The apparatus of claim 21 wherein the optical intensity parameters are further based on, for each span, determining stimulated Raman scattering (SRS) induced variations of signal intensity of an optical signal at a receiving end of the span, the SRS induced variations being dependent on the signal intensity of the optical signal at a transmitting end of the span.